actron®

**CP9449**

# *ABS BrakeScan™*

# *User Manual*

# Section 1 – Safety Precautions

For your safety, read this manual thoroughly before operating the Tool. Always refer to and follow safety messages and test procedures provided by the manufacturer of the vehicle or equipment being tested.

The safety messages presented below and throughout this user's manual are reminders to the operator to exercise care when using this test instrument.

## Read All Instructions

Read, understand and follow all safety messages and instructions in this manual and on the test equipment. Safety messages in this section of the manual contain a signal word with a three-part message and, in some instances, an icon.

## Safety Messages

Safety messages are provided to help prevent personal injury and equipment damage. All safety messages are introduced by a signal word. The signal word indicates the level of the hazard in a situation. The types of safety messages are:

| | |
|---|---|
| **⚠DANGER** | **Indicates a possible hazardous situation which, if not avoided, *will* result in death or serious injury to operator or bystanders.** |
| **⚠WARNING** | **Indicates a possible hazardous situation which, if not avoided, *could* result in death or serious injury to operator or bystanders.** |
| **⚠CAUTION** | **Indicates a possible hazardous situation which, if not avoided, *may* result in *moderate or minor injury* to operator or bystanders.** |
| **IMPORTANT** | **Indicates a condition which, if not avoided, *may* result in *damage* to test equipment or vehicle.** |

### Type Styles Used

Safety messages contain three different type styles.

- Normal type states the hazard.
- **Bold** type states how to avoid the hazard.
- *Italic* type states the possible consequences of not avoiding the hazard.

## Icons Used

An icon, when present, gives a graphical description of a potential hazard.

Example:

Engine systems can malfunction expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

**Safety goggles and protective gloves must be worn by the operator and any bystanders. Even if everyday eyeglasses have impact resistant lenses, they are NOT safety glasses.**

*Engine systems that malfunction can cause injury.*

# Important Safety Messages

Risk of electric shock.

- **Do not exceed voltage limits between inputs indicated in the Specifications.**
- **Use extreme caution when working with circuits that have voltage greater than 60 volts DC or 24 volts AC.**

*Electric shock can cause injury.*

Risk of explosion.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- **Do not use this Tool in environments where explosive vapors may collect. These areas include:**
  - below-ground pits.
  - confined areas.
  - areas that are less than 18 inches above floor.
- **If used indoors, use the Tool in locations with mechanical ventilation providing at least 4 air changes per hour.**

- **Flammable fuel and vapors can ignite.**
- **Do not smoke, strike a match, or cause a spark in the vicinity of the battery. Battery gases can ignite.**
- **Avoid making an accidental connection between the battery terminals. Do not place anything on the battery.**
- **When removing battery cables, remove the ground cable first.**
- **Avoid sparks when connecting or disconnecting power leads to the battery.**
- **Make sure ignition is off, headlights and other accessories are off and vehicle doors are closed before disconnecting the battery cables.**
  - This also helps prevent damage to on-board computer systems.
- **Always disconnect the battery ground cable before servicing electrical system components.**

*Explosion can cause injury.*

Risk of poisoning.

- **If used indoors, use the Tool in locations with mechanical ventilation providing at least 4 air changes per hour. Engine exhaust contains odorless gas which can be lethal.**
- **Route the exhaust outside while testing with the engine running.**

*Poisoning can result in death or serious injury.*

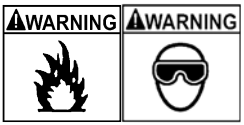
Battery acid is a highly corrosive sulfuric acid.

- **Safety goggles and protective gloves must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- **Make sure someone can hear you or is close enough to provide aid when working near a battery.**
- **Have plenty of fresh water nearby.**

- If battery acid contacts skin, clothing, or eyes, flush exposed area with water for 10 minutes. Seek medical help.

- **Do not touch eyes while working near battery.**

*Battery acid can burn eyes and skin.*




Risk of fire.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

- **Do not position your head directly in front of or over the throttle body.**

- **Do not pour gasoline down the throttle body when cranking or running the engine, when working with fuel delivery systems or any open fuel line.**
  - Engine backfire can occur when the air cleaner is out of position.

- **Do not use fuel injector cleaning solvents when performing diagnostic testing.**

- **Keep cigarettes, sparks, open flame and other sources of ignition away from vehicle.**

- **Keep a dry chemical (Class B) fire extinguisher rated for gasoline, chemical and electrical fires in work area.**

*Fire can cause death or serious injury.*

Risk of flying particles.

- **Safety goggles must be worn by the operator and any bystanders while using electrical equipment.**
  - Electrical equipment or rotating engine parts can cause flying particles.
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

*Flying particles can cause eye injury.*

Risk of burns.

- **Batteries can produce a short-circuit current high enough to weld jewelry to metal.**
  - Remove jewelry such as rings, bracelets and watches before working near batteries.

*Short circuits can cause injury.*

Risk of burns.

- **Do not remove radiator cap unless engine is cold.**
  - Pressurized engine coolant may be hot.
- **Do not touch hot exhaust systems, manifolds, engines, radiators, sample probe.**
- **Wear insulated gloves when handling hot engine components.**
- **Tester leads can become hot after extended testing in close proximity to manifolds.**

*Hot components can cause injury.*

Risk of expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- **Engine systems can malfunction, expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.**

*Fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris can cause serious injury.*

Engine compartment contains electrical connections and hot or moving parts.

- **Keep yourself, test leads, clothing and other objects clear of electrical connections and hot or moving engine parts.**

- **Do not wear watches, rings, or loose fitting clothing when working in an engine compartment.**
- **Do not place tools or test equipment on fenders or other places in engine compartment.**
- **Barriers are recommended to help identify danger zones in the test area.**
- **Prevent personnel from walking through test area.**

*Contacting electrical connections and hot or moving parts can cause injury.*

Risk of injury.

- **Use the Tool only as described in the user's manual.**
- **Use only manufacturer's recommended attachments.**
- **Do not operate the Tool with damaged cables.**
- **Do not operate the Tool if it has been dropped or damaged, until examined by a qualified service representative.**

*Operation of the Tool by anyone other than qualified personnel may result in injury.*

Risk of unexpected vehicle movement.

- **Block drive wheels before performing a test with the engine running.**
- **Unless instructed otherwise:**
  - Set parking brake
  - Put gear selector in neutral for manual transmissions
  - Put gear selector in park for automatic transmissions
  - Disconnect release mechanism on the automatic parking brake release for testing and reconnect when testing is completed.
- **Do not leave a running engine unattended.**

*A moving vehicle can cause injury.*

**⚠CAUTION**

Risk of equipment or circuit damage.

- **Unless specifically directed by manufacturer, make sure ignition is off before connecting or disconnecting connectors or any vehicle electrical terminals.**

- **Do not create a short between battery terminals with a jumper wire or tools.**

*Improper equipment use can cause equipment or circuit damage.*

**⚠CAUTION**

Misdiagnosis may lead to incorrect or improper repair and/or adjustment.

- **Do not rely on erratic, questionable, or obviously erroneous test information or results.**
  - If test information or results are erratic, questionable, or obviously erroneous, make sure all connections and data entry information are correct and test procedures were performed correctly.
  - If test information or results are still suspicious, do not use them for diagnosis.

*Improper repair and/or adjustment may cause vehicle or equipment damage or unsafe operation.*

**⚠DANGER**

Some vehicles are equipped with air bags.

- **Follow service manual warnings when working around air bag components or wiring.**
  - If service manual instructions are not followed, an air bag may deploy unexpectedly, resulting in injury.
  - Note an air bag can still deploy several minutes after ignition key is off (or even if vehicle battery is disconnected) because of a special energy reserve module.

*An air bag opening can cause injury.*

# Section 2 – Getting Started



## Introduction

ABS BrakeScan is the first tool designed for Do-It-Yourselfers to access the ABS diagnostic information. The Tool retrieves codes from the ABS system and provides the definition of each code to help pinpoint the problem areas within the Antilock Brake System that may have caused the ABS light to turn on.

The Tool was developed by experts in the automotive service industry to access the information stored in the ABS module.

All information, illustrations and specifications contained in this manual are based on the latest information available from industry sources at the time of publication. No warranty (expressed or implied) can be made for its accuracy or completeness, nor is any responsibility assumed by the manufacturer or anyone connected with it for loss or damages suffered through reliance on any information contained in this manual or misuse of accompanying product. The manufacturer reserves the right to make changes at any time to this manual or accompanying product without obligation to notify any person or organization of such changes.

## ABS Overview

Anti-Lock Brake Systems (ABS) began being used on vehicles in the mid-1980's. The mechanical components of the hydraulic-brake system (master cylinder, shoes, pads, wheel cylinders, calipers, rotors, drums, and assorted hardware) work the same as they did before ABS. What has changed, however, is the addition of an ABS computer module, wheel speed sensors, and a hydraulic control unit consisting of solenoid valves.

### How ABS works

When the brake pedal is pressed with normal force, the vehicle decelerates. If, during deceleration, the ABS computer detects wheels going at different speeds (wheels slipping) from data provided by the wheel speed sensors, then the vehicle enters antilock mode. During antilock mode, the ABS computer will control brake fluid hydraulic pressure delivered to the wheels. The brake fluid hydraulic pressure will be equal to or less than the value delivered by the master cylinder. By controlling pressure to the wheels, the ABS computer can prevent one wheel from locking up while others keep turning. It can also prevent wheels from turning at different rates, so the vehicle should stop in a straight line.

### ABS Configurations

ABS has had three different configurations for distribution of wheel speed sensors and hydraulic lines from the hydraulic control unit since its conception:

- The earliest ABS configuration used one wheel speed sensor that monitor the speed of both rear wheels. If the rear wheels would lock up, the ABS computer would pulse a solenoid in the hydraulic control unit, which would then change the brake fluid hydraulic pressure applied to the rear wheels.
- The next evolution in ABS added wheel speed sensors to both front wheels, while still having a single wheel speed sensor in the rear to monitor

both rear wheels. Under this system, if the left front, right front, or both rear wheels rotate at a speed different from each other, the ABS computer could use up to three separate solenoids to control brake fluid hydraulic pressure. This allowed the ABS system to control the left front, right front, and both rear wheels together independently.

- Today, some vehicles have one wheel speed sensor per wheel for a total of four. On these vehicles, the ABS computer can independently control brake fluid hydraulic pressure on every wheel.



## ABS Malfunction Indicator Lamp (MIL)

The dashboard or instrument panel of your vehicle contains a light labeled something similar to ABS, or Anti-Lock, if the vehicle is ABS equipped. Some vehicles will also have a light marked BRAKE. This light usually indicates a loss of brake fluid hydraulic pressure or that the master cylinder is low on brake fluid. Refer to your owner's manual for a description of the lights in your vehicle. Each time your vehicle is started, the ABS computer performs a self-test called a Drive Cycle during the first acceleration to make sure the ABS components are working correctly. If the ABS computer detects a malfunction at completion of the Drive Cycle, ABS will turn on the ABS MIL. When the ABS MIL is on, a Diagnostic Trouble Code (DTC) is stored in the ABS computer. **Once a repair has been successfully made, the ABS computer, on most vehicles, should turn off the ABS MIL at completion of the next Drive Cycle.**

## ABS Repair Tips

- Before servicing your ABS, refer to the manufacturer's recommendations.
- Torque the wheel lug nuts properly to avoid bending a rotor or drum, which can cause inaccurate wheel speed sensor readings.
- Bleed the brake system properly.
- Always add fresh brake fluid to the master cylinder.
- Always replace tires with the manufacturer's recommended size.
- Always rotate tires as recommended by manufacturer.
- When interpreting DTCs retrieved from the vehicle, always follow the manufacturer's recommendations for repair.

**⚠WARNING**

The Tool may not detect every malfunction. Do not take chances with brakes, steering, or other vital functions of your vehicle, as a serious accident could result. Always follow vehicle manufacturer’s warnings, cautions, and service procedures.

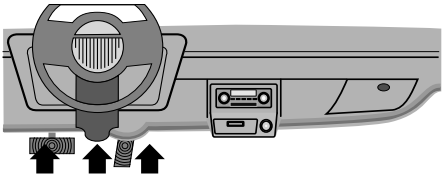
# Data Link Connector (DLC)



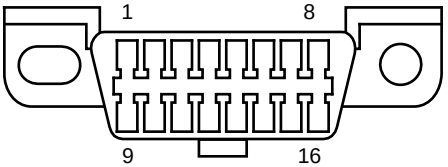
The Data Link Connector (DLC) is used with the Tool to communicate with the vehicle's control module.

**Data Link Connector Location:**

- ❒ Under dashboard on driver side of vehicle.
- ❒ If Data Link Connector is not located under the dashboard, a label should be there telling you where it is located.



## Data Link Connector (DLC) Pins




1 - Manufacturer Reserved
2 - J1850 Bus+
3 - Manufacturer Reserved
4 - Chassis Ground
5 - Signal Ground
6 - CAN High, J-2284
7 - K Line, ISO 9141-2 & ISO/DIS 14230-4
8 - Manufacturer Reserved
9 - Manufacturer Reserved
10 - J1850 Bus-
11 - Manufacturer Reserved
12 - Manufacturer Reserved
13 - Manufacturer Reserved
14 - CAN Low, J-2284
15 - L Line, ISO 9141-2 & ISO/DIS 14230-4
16 - Battery Power

# Section 3 – Using the Tool

## The Tool

1. LCD Display - Backlit, 128 x 64 pixel display with contrast adjustment.
2. ◀/▶ LEFT/RIGHT and ▲/▼ UP/DOWN arrow keys - Moves the cursor to select functions or to select YES or NO.
3. ENTER key - Selects displayed items.
4. ⏮ BACK key - Goes to the previous screen or level.
5. USER key - allows the operator to perform Read Codes with a touch of a key.
6. ON/OFF - turns the tool power ON or OFF.
7. DLC Port - Provides a connection for interfacing with the vehicle.
8. USB Port - Provides a USB connection to the computer.
9. Serial Number Decal - Provides serial number of the Tool.
10. Battery Compartment - Provides power to the Tool when reprogramming from a personal computer or for off-vehicle use such as reviewing of codes, code lookup, and system setup. (Battery not required to use tool for reading codes.)

# Specifications

**Table 1: Specifications**

**Display:** 128 x 64 pixel display with contrast adjust

**Operating Temperature:** 0 to 50°C (32 to 122°F)

**Storage Temperature:** -20 to 70°C (-4 to 158°F)

**Internal Power:** 9V Battery (not required to read codes)

**External Power:** 7 to 16 Volts



✓ A minimum of 8.0 V is required for most vehicle control modules to operate properly.

**Power Dissipation:** 5 Watts maximum.

| **Dimensions:** | **Height** | **Width** | **Length** |
|---|---|---|---|
| | 7/8” | 3.50” | 8.25” |
| | 22.56 mm | 89 mm | 210 mm |

## Included with the Tool

**Table 2: Package Contents**

| | |
|---|---|
| **BrakeScan Tool:** | Used to run diagnostics on ABS. |
| **Vehicle Diagnostics Cable:** | Provides link between the vehicle and Tool so the Tool can communicate with the vehicle. Also supplies power to the Tool. |
| **Carry Case:** | Place to store the Tool when not in use. |

# Display

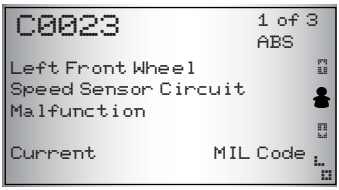
The display has a large viewing area for posting messages, instructions, and diagnostic information.

✓ The back-lit liquid crystal display (LCD) is a 128 x 64 pixel display.

❒ The following symbols may appear on the display. The chart below describes what each symbol means:

- Indicates that additional information is available on the previous screen. Press the ▲ UP arrow key to view the data.
- Indicates that additional information is available on the next screen. Press the ▼ DOWN arrow key to view the data.
- Indicates that the internal battery needs replacing or is not installed. Replace or install the internal battery.
- Indicates that the USER key is active. Press the USER key to read codes.






# Keypad

The keypad is used to move through the different menus of the Tool. The Tool's software is designed for easy operation with an intuitive navigation system.

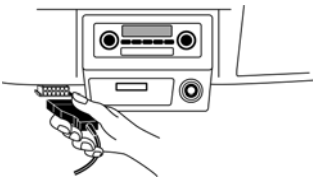
**⚠CAUTION** Do not use solvents such as alcohol to clean the keypad or display. Use a mild nonabrasive detergent and a soft cotton cloth.

**⚠CAUTION** Do not soak the keypad in water because the water might find its way inside the Tool.

# Tool Power Up



Power for the Tool can come from the vehicle or an internal 9V battery. All functions work when the Tool is connected to the car. The Review Codes, Code Lookup, and System Setup functions will also work on internal battery power.



**Vehicle Power**

The Tool will automatically turn on when connected to the vehicle.

1. Attach the unit to the car.
2. Connect the Vehicle Diagnostics Cable to the Tool.
3. Connect the end of the Vehicle Diagnostics Cable to the Data Link Connector (DLC).

✓ The Tool receives power from the vehicle when the Vehicle Diagnostics Cable is plugged into the vehicle's DLC

**Internal Battery**

The ⏻ ON/OFF key turns the Tool ON and OFF when operating on battery power.

❒ Press and hold the ⏻ ON/OFF key for at least 1 second to turn the Tool on or off.

✓ The Tool will automatically turn off after 2 minutes of inactivity when powered from the internal 9V battery.

✓ When powered from the internal battery, the Tool turns off the backlighting for the display if no key presses are made during a 1-minute period.

✓ If a key is pressed prior to the Tool powering off, the backlighting for the display will turn back on.

✓ The Tool must be attached to the vehicle to perform diagnostic functions. The Tool disables the diagnostic functions when powered from the internal battery.

✓ Each time the Tool is powered up, the voltage of the internal battery is checked.

❒ If the voltage is low, the Low Battery Symbol (🪫) displays on the screen.

❒ Replace the battery using instructions provided in "**Battery Replacement**

**⚠CAUTION** If the Tool will not be used for an extended period of time, remove the battery to prevent battery leakage from damaging the battery compartment.

## User Key

The USER key allows you to read codes from the Diagnostic menu without having to select Read Codes. Press the USER key to update or read codes from the vehicle.

- ❒ When the USER key is active, the icon appears on the display.
- ❒ When the appears, you can perform read codes by pressing the USER key.
- ❒ The USER key remains inactive until a vehicle has been selected.



**Note:** The USER key is not active when the Tool is powered from the internal 9V battery.

# System Setup

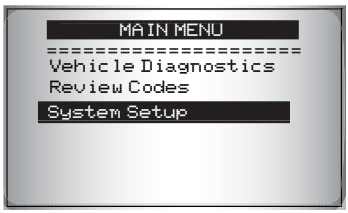
✓ **System Setup** allows you to:

- ❒ Adjust Contrast
- ❒ Test the Display
- ❒ Test the Keypad
- ❒ Test the Memory
- ❒ View Tool Information
- ❒ Program the Tool

✓ ***System Setup*** settings are retained even if the internal battery becomes discharged or is removed.

From the ***Main Menu***:

1. Select ***System Setup***.
   - Press the ▲ UP or ▼ DOWN arrow key until ***System Setup*** is highlighted.
   - Press ENTER.

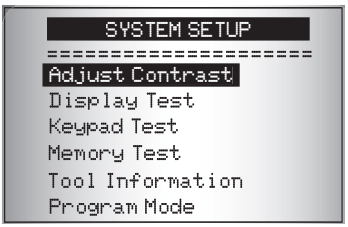


# Adjust Display Contrast



From the ***System Setup*** menu:

1. Select ***Adjust Contrast***.
   - Press the ▲ UP or ▼ DOWN arrow key until ***Adjust Contrast*** is highlighted.
   - Press ENTER**.**




2. Adjust ***Display Contrast***.
   - Press the ▲ UP arrow key to darken.
   - Press the ▼ DOWN arrow key to lighten.

3. Save the ***Contrast setting***.
   - Press ENTER.

4. Return to ***System Setup***.
   - Press the ⏮ BACK Key.

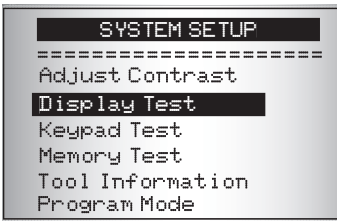
# Display Test

The ***Display Test*** is used to check the display.

✓ The test turns on every pixel of the display.

From the ***System Setup*** menu:

1. Select ***Display Test.***
   - Press the ▲ UP or ▼ DOWN arrow key until ***Display Test*** is highlighted.




2. Start ***Display Test.***
   - Press ENTER.

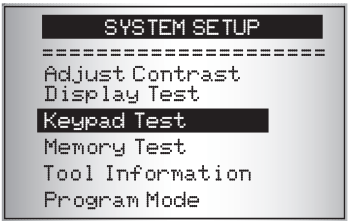
3. Look for ***Missing Pixels***.
   - All pixels display in solid black if there are no concerns.
   - Screen flips back and forth between screens shown below.

4. Return to ***System Setup***.
   - Press the ◀◀ BACK Key.

# Keypad Test



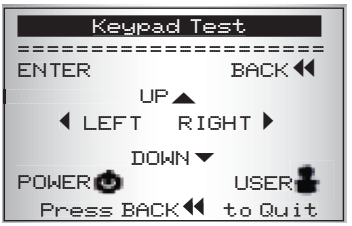
The ***Keypad Test*** is used to verify that the keys are working correctly.




From the ***System Setup*** menu:

1. Select ***Keypad Test.***
   - Press the ▲ UP or ▼ DOWN arrow key until ***Keypad Test*** is highlighted.
   - Press ENTER.

2. Press a ***Key***.
   - Key name or scroll direction should inverse colors on the display.
   - The only exception is the ⏮ BACK key. When ⏮ BACK key is pressed, the ***System Setup*** menu appears.




**Note:** If the ***System Setup*** menu does not appear, then the ⏮ BACK key is not working correctly. Contact Technical Support for assistance. The phone number for Technical Support is provided on the back side of the title page.

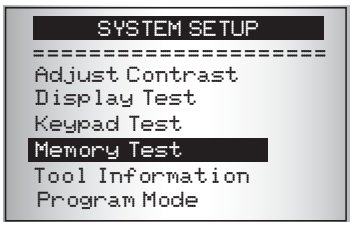
# Memory Test

The ***Memory Test*** will test the tool's internal memory. Run the ***Memory Test*** if the Tool:

- Has trouble displaying trouble code definitions.
- Operates abnormally.

From the ***System Setup*** menu:

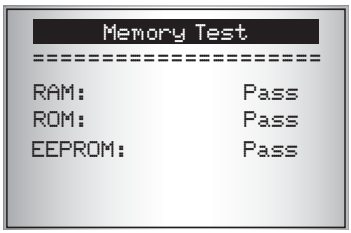
1. Select ***Memory Test***.
   - Press the ▲ UP or ▼ DOWN arrow key until ***Memory Test*** is highlighted.
   - Press ENTER.




✓ The tool reports its progress on the bottom of the display.

❒ The ***Memory Test*** may take several minutes to complete.

❒ The ***Memory Test*** results display:
   - If no problems were detected, then PASS is displayed
   - If RAM fails, an error message is shown.
   - If ROM fails, a checksum is shown.
   - If the ***Memory Test*** fails, contact Technical Support. The phone number for Technical Support is provided on the back side of the title page.



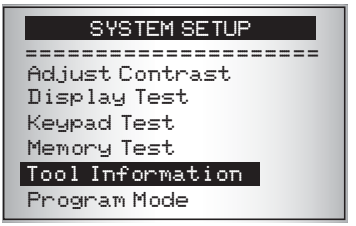

2. Return to ***System Setup***.
   - Press ⏮ BACK.

# View Tool Information

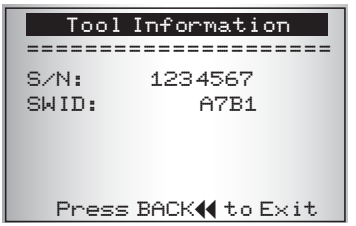
This function allows you to view specific tool information that may be needed when contacting customer service.

From ***System Setup*** menu:

1. Select ***Tool Information***.
   - Press the ▲ UP or ▼ DOWN arrow key until ***Tool Information*** is highlighted.
   - Press ENTER.

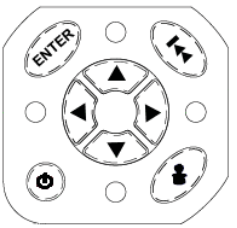



2. View the ***Tool Information***.
   - S/N (Serial No:)
   - Software ID (SW ID:)



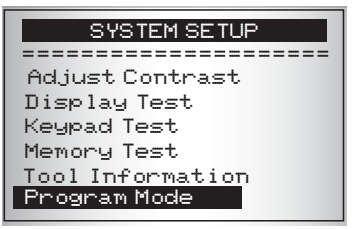

3. Write Down the ***Tool Information***.
   - Space is provided on inside front cover of this guide to record the Tool information.

4. Return to ***System Setup***.
   - Press ⏮ BACK.




## Program Mode

The Program Mode is used to reprogram the Tool. Instructions are provided with the upgrades.



# Connecting the Tool

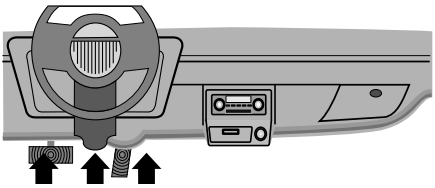
To diagnose a vehicle, connect the Vehicle Diagnostics Cable to the Tool.

**Tip:** If you just want to power up the tool to review codes from the last vehicle tested, then you do not need to attach the Vehicle Diagnostics Cable to the vehicle. The internal battery provides power for this.



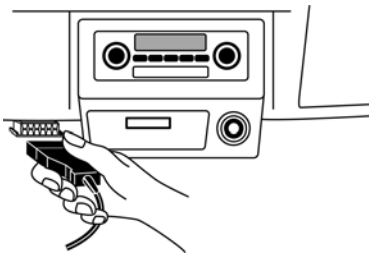
1. Connect the ***Vehicle Diagnostics Cable*** to the Tool.
   - Make sure the pins on the cable are not bent.

2. Find the ***Data Link Connector*** on the vehicle.
   - Look under the dashboard on the driver's side of the vehicle.
   - If the Data Link Connector (DLC) is not located under the dashboard, a label should be there telling you where it is located.



3. Remove the ***DLC cover*** if required.

4. Connect the ***Vehicle Diagnostics Cable*** to vehicle.
   - Make sure the pins are not bent.



# Vehicle Selection

Selecting a vehicle is required to communicate with the vehicle and to correctly display DTC definitions. The Tool keeps all data received from the last vehicle selected until a new vehicle is selected or the Tool is reprogrammed to update software.

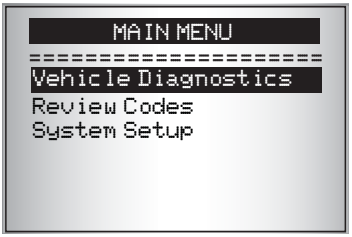


During vehicle selection, the Tool may ask for the following information:

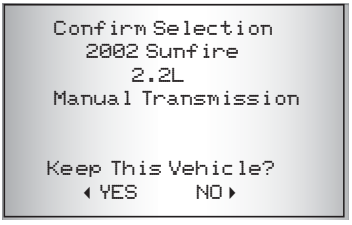
- ❒ Manufacturer
- ❒ Car/Truck
- ❒ Year
- ❒ Make
- ❒ Model
- ❒ Engine
- ❒ Special Information

From the ***Main Menu:***

1. Choose ***Vehicle Diagnostics***.
   - Press the ▲ UP or ▼ DOWN arrow key until ***Vehicle Diagnostics*** is highlighted
   - Press ENTER.

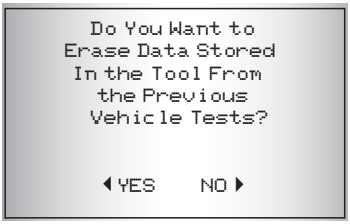



2. Select to ***KEEP*** or ***CHANGE*** vehicle.
   - To run or review diagnostics on the same vehicle, press ◀ **LEFT** for ***YES***. Continue these instructions with Step 3.
   - To run diagnostics on a different vehicle, press ▶ **RIGHT** for ***NO***. Continue these instructions with Step 4.
   - If this is the first time that you are using the tool or no vehicle identification information is stored in memory, the Tool will ask you to provide vehicle identification information. Go to Step 5 below to continue.

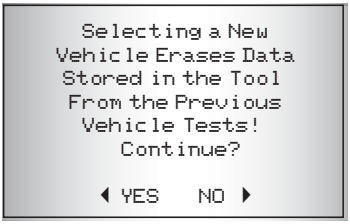



✓ The vehicle identification information is used by the Tool to perform diagnostics. Enter or confirm vehicle identification information.

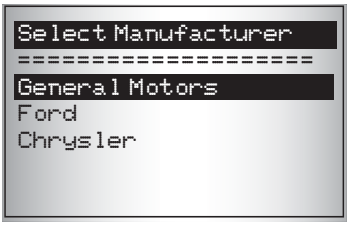
3. Select to ***KEEP*** or ***ERASE*** diagnostic data.
   - To erase data stored from the previous vehicle test, press ◀ **LEFT** for ***YES***. Then go to Section 4 for instructions on running Vehicle Diagnostics.
   - To keep the existing diagnostic data to review, press ▶ **RIGHT** for ***NO***. Then go to Section 4 for instructions on ***Reviewing Codes***.



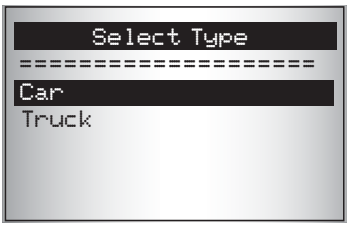

4. Select ***New Vehicle***?
   - To erase the data stored on the tool, press ◀ **LEFT** for ***YES***. Then go to Step 5 to enter the new vehicle identification information.
   - To keep the data stored in the tool, press ▶ **RIGHT** for ***NO***. Then repeat these instructions from Step 2.



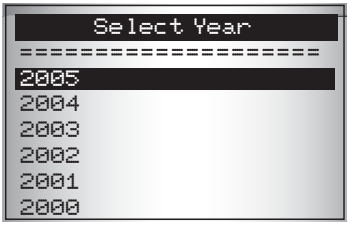

5. Select ***Vehicle Manufacturer***.
   - Press the ▲ UP or ▼ DOWN arrow key to select vehicle manufacturer.
   - Press ENTER.




6. Select the ***Vehicle Type***.
   - Press the ▲ UP or ▼ DOWN arrow key to select vehicle type.
   - Press ENTER.

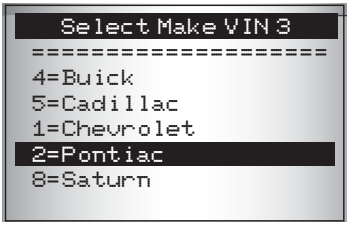


7. Select the ***Year***.
   - Press the ▲ UP or ▼ DOWN arrow key to select the Year.
   - Press ENTER.




8. Select the ***Make***.
   - Press the ▲ UP or ▼ DOWN arrow key to select the Make.
   - Press ENTER.

✓ On GM vehicles the tool may require you to look at the VIN to determine the Series Model, Engine Size, etc.

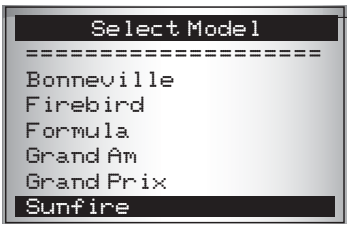



✓ The following screen is for reference only.

**Table 3: GM Typical VIN**

| VIN Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Description of Number | | | Make | | Series | Line Chassis | Chassis Type | Engine Type | | Model Year | | | | | | |

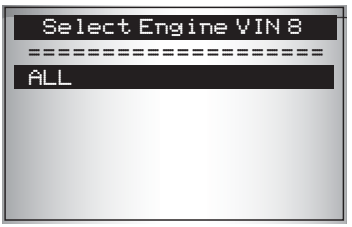
9. Select the ***Model***.
   - Press the ▲ UP or ▼ DOWN arrow key to select the Model.
   - Press ENTER.




10. Select the ***Engine***.
    - Press the ▲ UP or ▼ DOWN arrow key to select the Engine.
    - Press ENTER.

✓ If all engine types apply, the word ALL alone will appear as shown to the right.

✓ In some instances, the vehicle information applies to all but a few engine sizes. In this instance, you will be given the opportunity to choose **All Others** for a size designation.



✓ When provided, select the exact engine size:

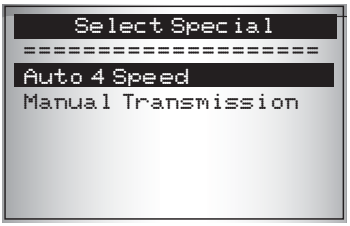
- ❒ 4.6L
- ❒ 2.3L
- ❒ All Others

✓ If a specific engine size is selected, you may also need to select additional information (called Special). If Special information is required to identify the ABS system, go to Step 11 to continue these instructions.

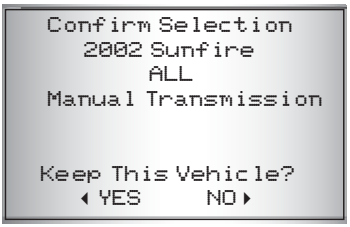
✓ If no additional information is required to identify the ABS system, skip to Step 12 to confirm the vehicle information selected.



11. Select ***Special***.
    - Press the ▲ **UP** or ▼ **DOWN** arrow key to select special information required to identify the ABS system.
    - Press ENTER.




12. Confirm ***Selections***.
    - Press ◀ **LEFT** for ***YES***.
    - Press ▶ **RIGHT** for ***NO***.



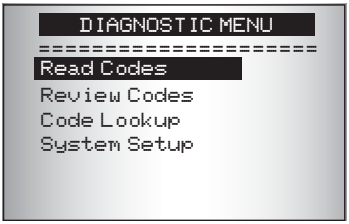

✓ If ***YES*** is selected, the Tool confirms the vehicle information and then goes to the ***Diagnostic Menu***. See Section 4 - Vehicle Diagnostics for instructions.

✓ If ***NO*** is selected, the Tool returns to the Select Manufacturer screen. Repeat these instructions from Step 5.

# ABS Diagnostic Menu

From the ***Diagnostic Menu***, you can:

- ❒ Read Codes
- ❒ Review Codes
- ❒ Lookup Codes
- ❒ Access System Setup






1. Return to the ***Main Menu***.
   - Press the ⏮ BACK key.

✓ The Tool keeps all data received from the last vehicle selected until any of the following occurs:

- ❒ Tool is reprogrammed to update software.
- ❒ A new vehicle is selected.

# Read Codes

The **Read Codes** function allows the Tool to read the diagnostic trouble codes (DTCs) from the vehicle's control modules. DTCs are used to help determine the cause of a problem or problems with a vehicle. The anti-lock brake control module reports DTCs pertaining to the brake system.

✓ **Read Codes** can be done with the key on engine off (KOEO) or with the key on engine running (KOER).

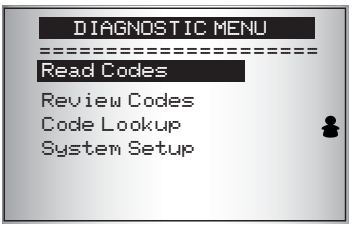
✓ If no DTCs are present, a message stating ***Pass: No Codes Found*** is displayed.



✓ To access the **Diagnostic Menu**, select **Vehicle Diagnostics** from the **Main Menu** and select a vehicle.

From the ***Diagnostic Menu***:

1. Select ***Read Codes***.
   - Press the ▲ UP or ▼ DOWN arrow key until **Read Codes** is highlighted.
   - Press ENTER.




**Note:** When the symbol appears on the display, you can read codes by pressing the User key.

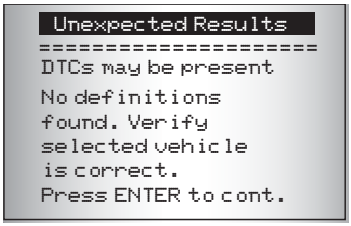
If an Error message displays, make sure the vehicle diagnostics cable is attached. Turn the ignition key off for 10 seconds, then on. (This may be required to reset the vehicle's computer. If the problem still exists, see "**Error Messages**

2. View ***diagnostic results*** and write down the ***DTCs***

Four possible results can occur:

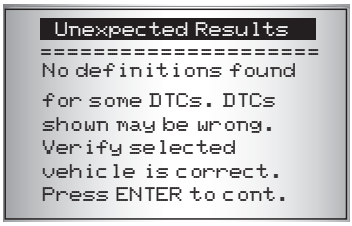
❒ If the information returned by the vehicle does not match the vehicle selected, you may get an **Unexpected Results** message.

- To return to the ***Diagnostic Menu***, press ENTER.
- To examine the selected vehicle information stored in the tool, press ⏮ BACK to return to the ***Main Menu*** and then select **Vehicle Diagnostics**.

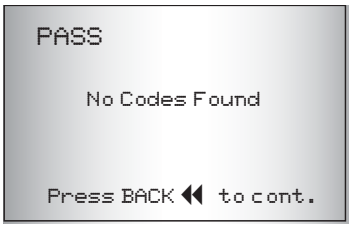



❒ If the tool is unable to display a definition for all the DTCs returned by the vehicle, you may get an **Unexpected Results - No definitions found for some DTCs** error message.

- To view the **DTCs**, press ENTER.
- Press the ▲ UP or ▼ DOWN arrow keys to scroll through the DTCs.


Unexpected Results
No definitions found for some DTCs. DTCs shown may be wrong. Verify selected vehicle is correct.
Press ENTER to cont.

❒ If no codes are found, a message appears indicating that No Codes were Found.




❒ If DTCs are found, the code and a definition will appear. For more information about the structure of the DTCs, see "**Understanding DTCs**" on page A-1.

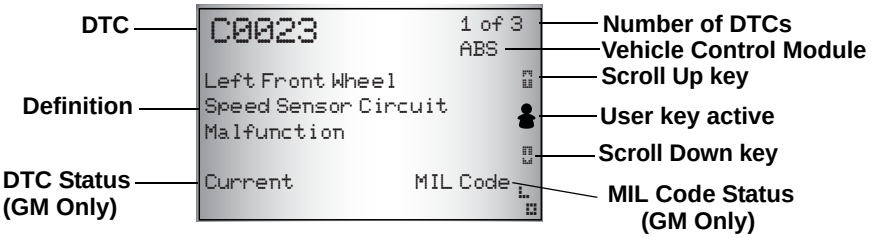
- Press the ▲ UP or ▼ DOWN arrow keys to scroll through the DTCs.

3. Return to the **Diagnostic Menu.**
   - Press the ⏮ BACK key.

**Note:** On most vehicles, if you successfully repair the cause of the DTC, then the ABS MIL should turn off after the next drive cycle completes.

# DTC Examples

Below are several DTC examples.

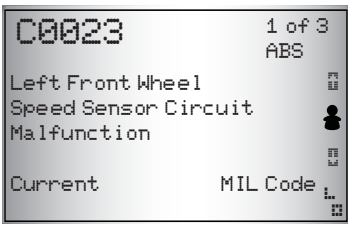



4

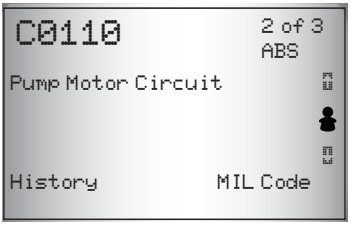
✓ General Motors provides additional information along with the DTCs:

- ❒ Current - A current DTC indicates that a failure is currently present. A current code may have just occurred or may have been present over time.
- ❒ History - A DTC with a History designation is one that has been detected by the anti-lock brake control module over a span of time. It is a current failure that has been present long enough to be stored in long-term memory.
- ❒ CURR/HIST - A CURR/HIST DTC indicates that a failure is both current and historical as defined above.
- ❒ Intermittent - An intermittent status indicates that the DTC has appeared intermittently since the anti-lock brake control module was reset. (Control modules are reset by mechanics after a repair has been completed.)
- ❒ MIL Code - Indicates that the ABS Computer is reporting that the ABS Malfunction Indicator Light is on. If MIL Code is displayed by the Tool, but the vehicle dashboard does not display the ABS MIL, then you have a potential problem with the circuit that controls the ABS MIL, the bulb itself, a fuse, or the electrical system.

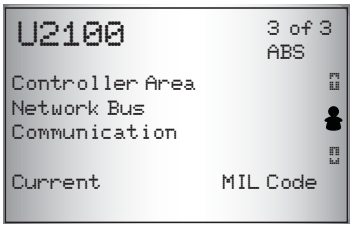
This code indicates that you currently have a problem with the Left Front Wheel Speed Sensor Circuit and that the problem is illuminating the ABS malfunction indicator lamp (MIL) on the dashboard.




This code indicates that you have had a problem with the Pump Motor Circuit long enough to be stored in long-term memory and that the problem is illuminating the ABS malfunction indicator lamp (MIL) on the dashboard. ABS systems rely on a pump to regulate brake fluid distribution.



This code indicates that you have a current problem with the Network Bus Communication for the ABS controller and that the problem is illuminating the ABS malfunction indicator lamp (MIL) on the dashboard.




## Code Lookup

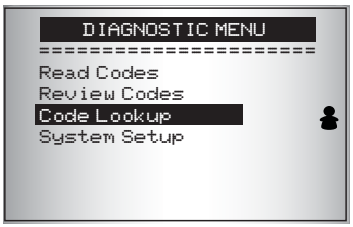
**Code Lookup** accesses a library of possible DTCs for the selected vehicle.

✓ The Tool does not require power from the vehicle to perform this function.

✓ **Code Lookup** is only available from the ***Diagnostic Menu*** because the user must select a vehicle prior to accessing the library.

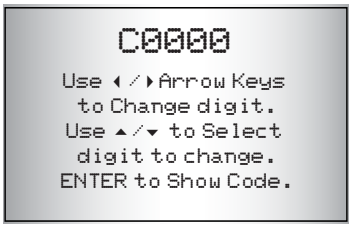


From the ***Diagnostic Menu:***




1. **Select Code Lookup.**
   - Press the ▲ UP or ▼ DOWN arrow key until **Code Lookup** is highlighted.
   - Press ENTER.

2. Enter a ***Code***.
   - Codes come in two formats: ***OBDII*** and ***Non-OBDII***. (For more information about the possible formats, see "**Understanding DTCs**" on page A-1.)
   - All characters must be entered.
   - Only one character can be changed at a time.
   - Use ◀ **LEFT** or ▶ **RIGHT** arrow keys to move to desired character.
   - Use ▲ UP or ▼ DOWN arrow keys to change or select a character.
   - Press ENTER.




✓ If the definition can not be found, the tool displays the message No Definition Found.

✓ Check the Service Manual for the vehicle for DTC definitions as well.

3. Enter another DTC or exit the ***Code Lookup*** function.
   - Press ⏮ BACK once then repeat these instructions from Step 2.

Or,

   - Press ⏮ BACK twice to return to the prior menu.

## Review Codes

The **Review Codes** function allows the user to view the codes reported from the previous vehicle tested.

4

✓ You cannot review codes until you have run the **Read Codes** function. For instructions on running the Read Codes function, see "**Read Codes"**

✓ The Tool does not require power from the vehicle to use the ***Review Codes*** function.

1. Select ***Review Codes***.
   The Review Codes function is available from both the ***Main Menu*** and the ***Diagnostic Menu*** for your convenience.

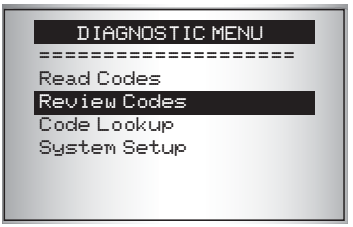
❒ **To Review Codes from the *Main Menu:***

- From the ***Main Menu***, press the ▲ UP or ▼ DOWN arrow key until ***Review Codes*** is highlighted then press ENTER.

Or,

❒ **To Review Codes from the *Diagnostic Menu:***

- From the ***Main Menu***, press the ▲ UP or ▼ DOWN arrow key until **Vehicle Diagnostics** is highlighted and then press ENTER.
- From the ***Diagnostic Menu***, use the arrow keys to highlight **Review Codes** and then press ENTER.

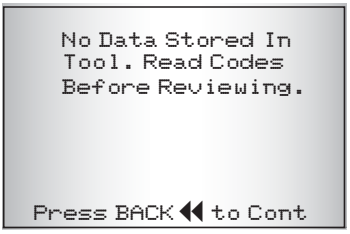


2. Follow prompts and instructions provided by the ***Tool***.

✓ Refer to "**Read Codes**" on page 4-2 for a description of the DTC screens.

✓ If data does not exist, a message informs the user to run the **Read Code** function.

- To return to the prior menu, press ⏮ BACK.



# Section 5 – Troubleshooting

## Error Messages

**Check the following if an error message displays:**

- ❒ Verify ignition key is in the ON and not in the ACCESSORIES position.
- ❒ Make sure Vehicle Diagnostics Cable is attached to vehicle's data link connector (DLC) and Tool.
- ❒ Look at DLC and check for cracked or recessed pins, or for any substance that could prevent a good electrical connection.
- ❒ Test for continuity between the DLC wiring and the vehicle computers. In an extreme case, there may be a broken wire.
- ❒ Check for bent or broken pins.
- ❒ With the key on engine off (KOEO), check for blown fuses.
- ❒ Make sure the vehicle's control module has a good ground. If the computer case for the vehicle is grounded, then clean the connection and apply a conductive (dielectric) grease to the mating surfaces.
- ❒ With the KOEO, verify battery voltage is at least 8.0V.
- ❒ Verify the control module is not defective. Refer to the service manual to diagnose the control module.



## Tool Does Not Power Up

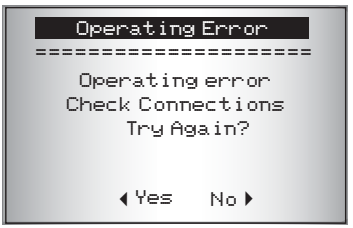
Review **Safety Precautions** before troubleshooting. If Tool will not power up, communicate with vehicle's control module, pass Tool self-tests, or functions incorrectly in any other way, do the following:

- ❒ Check and replace the 9V battery if needed.
- ❒ Clean the DLC pins.
- ❒ Disconnect and reconnect DLC making sure it is connected correctly.
- ❒ Check vehicle battery to make sure at least 8.0 volts is present.
- ❒ Contact customer service.

# Operating Error or Erroneous Data

An **Operating Error** or **Erroneous Data** error occurs if vehicle's computer(s) stop(s) communicating with Tool.

1. Make Selection.
   - Press the ◀ LEFT or ▶ RIGHT arrow key.
   - Press ENTER**.**






# Battery Replacement

The Tool requires a 9V alkaline battery to operate without vehicle power. Review Codes, Code Lookup, and System Setup functions work on internal battery and vehicle power. The Read Codes function works on vehicle power only.

✓ When the battery needs to be replaced, the low-battery icon ( ) displays.

✓ Rechargeable batteries do not last as long as alkaline types and are not recommended.

✓ Non-rechargeable Lithium (Li) battery can be used. Though Lithium types last longer than the alkaline types, and they are more expensive.

1. Place ***Display*** Face Down.
   - On a non-abrasive surface.

2. Remove ***Battery Cover***.
   - Turn the phillips screw counterclockwise.
   - Slide battery cover off.

3. Remove ***Battery*** and Properly Discard.

4. Install ***New Battery***.
   - 9V Alkaline Battery.

5. Reinstall ***Battery Cover***.
   - Slide battery cover on.
   - Install phillips screw turning it clockwise.
   - Do not overtighten screw.



# Tool Self-Tests

***Tool Self-Tests*** check the display, keys, and internal memory.